UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,934	03/13/2007	Armin Bartsch	BART3002/JJC/BEL	2098

23364 7590 10/28/2010

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
CONWAY, THOMAS A	
ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
10/28/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,934	BARTSCH ET AL.	
	Examiner	Art Unit	
	THOMAS A. CONWAY	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,15,16,21-26,29 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,15,16,21-26,29 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/24/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendments of claims 22 and 29, filed on 10/04/2010 have been entered and made record of.

Election/Restrictions

2. Applicant's election without traverse of claims 2-12, 15-16, 22-26 and 29-30 in the reply filed on 10/04/10 is acknowledged. Claims 1 and 21 are considered generic claims.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, **the normalization of the intensity domains as recited in claims 15 and 29 for example**, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claim 2 is rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the instant claim recites "different portions of the continuous intensity domain" but there is no explanation as to how these portions are established. It is unclear if the portion is limited by amplitude, sampling length or sampling time. Also, for example, the portions may be identified according to thresholding, offsetting, variable ranges; it is unclear as to how identification of these portions is accomplished. Further development in the dependent claims do not remedy the issue.

There are similar issues with claims 3-12, 15-16, 22-26 and 29-30.

5. **Claim 15 is rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the claim recites on line 4 that "the respective digital signal" performs detection; it is unclear how the signal performs the recited detection.

There is a similar issue with claim 29.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim1-10 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Setlak et al. (US 6,259,804 B1: hereafter "Setlak") in view of Fossum et al. (US Pub. 2002/0057845 A1: hereafter "Fossum").

6. Regarding claim 1, Setlak discloses a method for digitizing at least a subarea of the papillary structure of the skin (Col. 5, ln 47-58: sensor size allows for sensing subarea of finger), the subarea defining an intensity profile with a continuous intensity domain (Fig. 12, item 191), comprising the steps of: transforming the intensity profile into at least one analog electrical signal, and transforming said analog electrical signal into at least one digital signal with an intensity domain comprising discrete intensity values and a space domain comprising discrete positions (Col. 11, ln 1-26: analog signals transformed to digital domain by plurality of A/D converters), repeatedly performing the transforming steps for the same subarea to form a plurality of different digital signals (Col. 11, ln 1-26: each A/D converter has distinct output, "different digital signals"), and combining the plurality of digital signals into a common digital papillary structure signal (Fig. 12: plurality of A/D converters combine D outputs), but fails to explicitly teach wherein an intensity domain formed from discrete intensity values and a

space domain is formed from discrete positions in such a way that the intensity domain of the papillary structure signal has more intensity values than the intensity domains of each single one of the plurality of digital signals.

Fossum in a related field of endeavor of imaging a region of interest with a sensor while expanding the dynamic range of a sensor, teaches wherein an intensity domain formed from discrete intensity values and a space domain is formed from discrete positions in such a way that the intensity domain of the signal has more intensity values than the intensity domains of each single one of the plurality of digital signals (¶ [0032-0034]: pixel information related to resolution according to bit representation of monochrome or color (see also ¶ [0007]: background); ¶ [0033]: signals are combined, resolution /overall dynamic range is increased - ¶ [0034]).

As Fossum describes, an increased dynamic range allows a sensor to have greater detail or discrete levels between a brightest and darkest area of interest to be imaged while avoiding saturation (¶ [0007]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the known work of Fossum for use in the related field of Setlak based on design incentives of increasing the dynamic range of sensors since the variation would have led to predictable results of increasing details between lightest and darkest areas while avoiding saturation.

7. Regarding claim 2, Setlak and Fossum teach the method according to claim 1. Fossum further teaches wherein the repeated performing of the transforming steps is

done for different portions of the continuous intensity domain in each case, so that after the combining step the intensity domain of the digital papillary structure signal covers a larger portion of the continuous intensity domain than the intensity domains of each single one of the plurality of digital signals (¶ [0033-0034]: different gain is applied to each ADC, covering a different portion of the signal, producing distinct output signals, their combination having a larger dynamic range - "intensity domain…covers a larger portion...than the domains of each single one").

8. Regarding claim 3, Setlak and Fossum teach the method according to claim 2. Fossum further teaches wherein upon the repeated performing of the transforming steps, the portions of the continuous intensity domain are determined upon transforming the intensity profile into the analog electrical signal (¶ [0035]: "fusion module carries out analog combination or these levels").

9. Regarding claim 4, Setlak and Fossum teach the method according to claim 3. Setlak further teaches wherein the determination of the second and the further portions is carried out by using data of the previous portion or portions (Col. 11, ln 2-6: "provides range determining and setting means for controlling the range of the A/D converters based upon prior A/D conversions").

10. Regarding claim 5, Setlak and Fossum teach the method according to claim 3. Fossum further teaches wherein the number of intensity values is determined by the choice or number of portions (¶ [0034]).

11. Regarding claim 6, Setlak and Fossum teach the method according to claim 3. Fossum further teaches wherein the transforming of the intensity profile into an analog electrical signal is done by a capacitive signal converter, and the portion of the continuous intensity domain is determined by quantities of charge applied to the capacitors of the capacitive signal converter (¶ [0060]).

12. Regarding claim 7, Setlak and Fossum teach the method according to claim 2. Fossum further teaches wherein upon the repeated performing of the transforming steps, the portions of the continuous intensity domain are determined upon transforming the analog electrical signal into a digital signal (¶ [0057]: "combine pixel signal levels in the digital domain").

13. Regarding claim 8, Setlak and Fossum teach the method according to claim 7. Setlak further teaches wherein the determination of the second and the further portions is carried out by using data of the previous portion or portions (Col. 11, In 2-6: "provides range determining and setting means for controlling the range of the A/D converters based upon prior A/D conversions").

14. Regarding claim 9, Setlak and Fossum teach method according to claim 7. Fossum further teaches wherein the number of intensity values is determined by the choice or number of portions (¶ [0034]).

15. Regarding claim 10, Setlak and Fossum teach method according to claim 2. Fossum further teaches wherein the portions of the continuous intensity domain together cover the total continuous intensity domain (¶ [0039]: reaches saturation points).

16. Claim 21 is rejected for at least the same reasoning as was previously presented with regards to claim 1.

17. Claim 22 is rejected for at least the same reasoning as was previously presented with regards to claim 2.

18. Claim 23 is rejected for at least the same reasoning as was previously presented with regards to claim 3.

19. Claim 24 is rejected for at least the same reasoning as was previously presented with regards to claim 6.

20. Claim 25 is rejected for at least the same reasoning as was previously presented with regards to claim 7.

21. Claim 26 is rejected for at least the same reasoning as was previously presented with regards to claim 10.

Claims 11-12, 15-16 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Setlak and Fossum.

22. Regarding claim 11, Setlak and Fossum teach the method according to claim 2 but their combination fails to teach wherein the portions of the continuous intensity domain are adjacent and do not overlap. It would have been obvious to one of ordinary skill in the art to cover an entire area of interest of a signal and in the case of using multiple sensors for particular areas, to not overlap the areas in order to more efficiently cover the signal, thereby reducing computational complexity or further need of hardware.

23. Regarding claim 12, Setlak and Fossum teach the method according to claim 2 but their combination fails to teach wherein the portions of the continuous intensity domain overlap. It would have been obvious to one of ordinary skill in the art to cover an entire area of interest of a signal and in the case of using multiple sensors for

particular areas, to overlap in order to capture points of correspondence in order to more accurately map the signal as a tradeoff to reducing computational complexity as previously presented.

24. Regarding claim 15, Setlak and Fossum teach the method according to claim 2 but their combination fails to teach wherein the combining step comprises before the estimating and entering substeps the following substep: normalizing the intensity domains of the plurality of digital signals to the portion of the continuous intensity domain detected by the respective digital signal. It would have been obvious to one of ordinary skill in the art to normalize the intensity domains of the plurality of digital signals to the portion of the continuous intensity domain detected by the respective digital signal in order to more accurately combine them and avoid areas of saturation.

25. Regarding claim 16, Setlak and Fossum teach the method according to claim 15. Fossum further teaches wherein upon the estimating step, only those discrete intensity values of the accordingly corresponding positions of the digital signals are taken into account that do not represent a maximum or minimum intensity value of the respective digital signal (¶ [0057] with reference to digital fusion as opposed to analog merging as recited in ¶ [0052-0053])).

26. Claim 29 is rejected for at least the same reasoning as was previously presented with regards to claim 15.

27. Claim 30 is rejected for at least the same reasoning as was previously presented with regards to claim 16.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gedcke et al. (US 6,028,543) teaches improving dynamic gain of sensor in sub LSB accuracy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS A. CONWAY whose telephone number is (571)270-5851. The examiner can normally be reached on Monday through Friday 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas A. Conway/
Examiner, Art Unit 2624

/Tom Y Lu/
Primary Examiner, Art Unit 2624